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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/840,286	04/23/2001	Narayan Srinivasa	HRL075	3326

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EXAMINER	
HIRL, JOSEPH P	

ART UNIT	PAPER NUMBER
2121	9

DATE MAILED: 03/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/840,286	SRINIVASA ET AL.	
	Examiner	Art Unit	
	Joseph P. Hirl	2121	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 December 2003*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12 and 19* is/are rejected.

7)☒ Claim(s) *13-18* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 6.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This Office Action is in response to an AMENDMENT entered December 29, 2003 for the patent application 09/840,286 filed on April 23, 2001.

2. The First Office Action of August 25, 2003 is fully incorporated into this Final Office Action by reference.

3. The claims and only the claims form the metes and bounds of the invention. "Office personnel are to give the claims their broadest reasonable interpretation in light of the supporting disclosure. *In re Morris,* 127 F.3d 1048, 1054-55, 44USPQ2d 1023, 1027-28 (Fed. Cir. 1997). Limitations appearing in the specification but not recited in the claim are not read into the claim. *In re Prater*, 415 F.2d, 1393, 1404-05, 162 USPQ 541, 550-551 (CCPA 1969)" (MPEP p 2100-8, c 2, l 45-48; p 2100-9, c 1, l 1-4). The Examiner has full latitude to interpret each claim in the broadest reasonable sense. Examiner will reference prior art using terminology familiar to one of ordinary skill in the art. Such an approach is broad in concept and can be either explicit or implicit in meaning.

4. Examiner's Opinion:

Para 3 above applies. ***Examiner has full latitude to interpret each claim in the broadest reasonable sense.*** Fuzzy logic is a well-established art. Applicant is encouraged to move the claims closer to the substance of the specification.

Status of Claims

5. Claims 1-19 are pending.

Response to Arguments

6. Applicant's arguments filed on December 29, 2003 related to Claims 1-19 have been fully considered but are not persuasive.

In reference to Applicant's argument:

The Applicants acknowledge the Examiner's assertion that the practical application test requires that a useful, concrete and tangible result be accomplished. Claim 1, claims in part "An improved method for generating an on-line fuzzy inference network for the classification of data ... the improvement comprising: ... in the case where the classification membership ... does not correctly match the known classification membership of the test data, tuning the fuzzy rule based on the classification error . . . and in the case where the classification membership ... correctly matches the known classification ... applying a learning rule to update the membership function parameters such that the classification error is minimized) . .." The Applicants submit that Claim 1 claims a useful, concrete and tangible result. Specifically, the useful, concrete and tangible result is the improvement in the generation of an on-line fuzzy inference network for the classification of data, where when there is no match, classification error is utilized to tune the fuzzy rule, and when there is a match the membership function parameters are updated to minimize the classification error. Thus, the Applicants submit that Claim 1 is directed toward statutory subject matter. Since Claims 2-9 are dependent on Claim 1, the Applicants submit that Claims 2-9 are also directed toward statutory subject matter.

The Applicants submit that an improved on-line fuzzy inference network is a useful, concrete and tangible result. Claims 1-10 and 19 are directed toward this improvement. Specifically, Claim 10 contains essentially the same language quoted above from Claim 1; therefore, the same arguments presented for Claim 1 also apply to Claim 10.

Claim 19 claims, in part, an "improved training system" wherein a "rule tuning and learning application processor" is "operative for determining whether the firing strength of the fuzzy rule exceeds a predetermined threshold, and in the case where the firing strength does not exceed a certain threshold, determining whether the classification membership ... matches the known classification membership of the test data, in the case where the classification membership . . . does not correctly match . . . tuning the fuzzy rule based on the classification error, and in the case where the classification membership ... correctly matches applying a learning rule to update the membership function parameters." The Applicants submit that Claim 19 claims a useful, concrete and tangible result. Specifically, the useful, concrete and tangible result is the improved training system where, when there is no match, classification

error is utilized to tune the fuzzy rule, and when there is a math the membership function parameters are updated to minimize the classification error. Thus, the Applicants submit that Claim 19 is directed toward statutory subject matter

.Examiner's response:

Applicant's quotation (p 3, l 20-21) from the MPEP needs further embellishment. The practical application test requiring a useful, concrete and tangible result must be done in the technical arts and to do so there is a requirement for tangible embodiment (MPEP 2106 IV B 2 (b)). Claims 1-10 and 19 require tangible embodiment in the technical arts. At the moment, claims 1-10 and 19 could be performed by hand. Rejection remains.

In reference to Applicant's argument:

Further, Applicants do not understand why the Examiner rejected Claim 19 as being directed toward non-statutory subject matter, while the Examiner did not reject Claim 11.

.Examiner's response:

Claim 11 is tangibly embodied in the technical arts ... see claim 11, lines 11, 12 ("... firing frequency count being stored in the processing device etc." It would be better from a statutory perspective to state "computer implemented" but a processing device can work since to one of ordinary skill in the art, a processor is at the heart of a computer.

In reference to Applicant's argument:

Col. 6, lines 29-35 of the Sirag patent state, referring to Fig. 3, "In fact, each plot has an abscissa of weight and an ordinate (not marked) of some normalized, dimensionless value, such as zero to one, which represent the relative likelihood that such number of passengers provide a weight signal of so many pounds. In a sense then, FIG. 3 is a table of twelve graphs, one per set, for sets relating to 0-11 passengers." The Applicants respectfully submit that nowhere in col. 6, lines 29-35 is there any mention of a "predetermined threshold" or equivalent language. Thus, the Applicants respectfully request that the

Examiner point out to the Applicants how he is interpreting col. 6, lines 29-35 to anticipate "determining whether the tiring strength of the fuzzy rule having the greatest firing strength exceeds a predetermined threshold," as is claimed in Claim 1. The Applicants assume that the Examiner believes that the constant PCMAX in col. 6, lines 44-45 anticipates a "predetermined threshold."

Assuming that the Examiner is indicating that PCMAX in the Sirag patent is the same as "a predetermined threshold" as claimed in Claim 1, the Applicant is confused as to the remainder of the Examiner's interpretation of the Sirag patent.

.Examiner's response:

Para 3 above applies. Examiner has full latitude to interpret each claim in the broadest reasonable sense. Thresholds abound in Sirag. For sure, "... which represent the relative likelihood that such number of passengers provide a weight signal of so many pounds." That is a threshold. The horizontal lines in the body of the graph of Fig. 3 are thresholds. To one of ordinary skill in the art, Sirag's application of fuzzy logic to an elevator system will have a plurality of thresholds. Fuzzy logic embodies thresholds.

In reference to Applicant's argument:

FIG. 4 of the Sirag patent is an illustration of the operation of the weight interpretation module 52. A description of F1G. 4 of the Sirag patent is presented in col. 6, lines 36-67. Starting at line 48, is the description of PC not being greater than PCMAX. Step d of Claim 1, claims in the case where the firing strength ... does not exceed the threshold ... n the case where the classification membership ... does not correctly match the known classification membership ... tuning the fuzzy rule based on the classification error ... and in the case where the classification membership ... correctly matches the known classification membership ... applying a learning rule to update the membership function parameters ..." In contrast, the Sirag patent teaches, in col. 6, starting at line 47, "if PC is not greater than PCMAX, control passes from the test step 113 to a step 114 , where a term, taken from the fuzzy set OF(PC) stored in the observed weight data element 53, is added to the fuzzy set FW. After the step 114, is a step 115 where the PC variable is incremented. The steps 113-115 are repeatedly executed to develop a set, which for 600 pounds might be ..." The Applicants submit that the Sirag patent does not teach, disclose or suggest that after determining that that the firing strength does not exceed the threshold determining "where the classification membership . . . does not correctly match the known classification membership . . . tuning the fuzzy rule based on the classification error and where the classification membership ... correctly matches the known classification membership ... applying a learning rule to update the membership parameters." In contrast, the Sirag patent teaches when the PC variable is not greater than PCMAX adding a data weight element to the fuzzy set and incrementing the PC variable. Therefore, the Applicants submit that the Sirag patent does not teach, disclose or suggest "where the classification membership ... does not correctly match the known classification membership ... tuning the fuzzy rule

based on the classification error and where the classification membership ... correctly matches the known classification membership . . . applying a learning rule to update the membership parameters," as is claimed in Claim 1.

Examiner's response:

Para 3 above applies. ***Examiner has full latitude to interpret each claim in the broadest reasonable sense.*** On this basis and from this perspective, indeed the Sirag patent teaches when the PC variable is not greater than PCMAX adding a data weight element to the fuzzy set and incrementing the PC variable which is equivalent to where the classification membership ... does not correctly match the known classification membership ... tuning the fuzzy rule based on the classification error. When PC > PCMAX, the flow in Sirag, Fig. 4, is down the right side where the value is stored. The applicant is encouraged to review para 3 above from which the Examiner has the obligation to interpret all claims in the broadest reasonable manner. In essence, the applicant by citing Sirag in the above analysis agrees with the Examiner that Sirag anticipates the applicant's invention.

In reference to Applicant's argument:

For the reasons presented above, Claim 1 is patentable over the art cited by the Examiner. As such, Claims 2-9 are also patentable over the cited prior art at least through their dependence upon an allowable base claim.

The same arguments presented above regarding Claim 1 can be applied to Claim 10. Therefore, the Applicants submit that Claim 10 is patentable over the cited prior art.

The same arguments presented above regarding Claim 1 can be applied to Claim 11.

Examiner's response:

Para 3 above applies. ***Examiner has full latitude to interpret each claim in the broadest reasonable sense.*** Sirag anticipates the applicant's invention.

Claim Rejections - 35 USC § 102

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1, 2, 10, 11, 12 and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by Sirag, Jr. et al (U. S. Patent 5,252,789, referred to as **Sirag**).

Claim 1

Sirag anticipates a. storing a firing frequency count and incrementing the firing frequency count for each fuzzy rule, indicating the number of times the fuzzy rule has been fired (**Sirag**, col 5, lines 59-68; col 6, lines 1-26; Examiner's Note(EN): a histogram defines a relationship between an "event" and the number of times that event occurred; the event is synonymous with fuzzy rule and the number of times is synonymous with firing frequency count); b. determining whether the firing strength of the fuzzy rule having the greatest firing strength exceeds a predetermined threshold (**Sirag**, col 6, lines 29-35; EN: firing strength is synonymous with frequency count); c. in the case where the firing strength of the fuzzy rule having the greatest firing strength exceeds the threshold, tuning the fuzzy rule based on the classification error (**Sirag**, col 6, lines 36-68; EN: the assigning of weight is associated with classification error); and d. in the case where the firing strength of the fuzzy rule having the greatest firing strength does not exceed the threshold, determining whether the classification membership generated by the fuzzy rule having the greatest firing strength correctly matches the known classification membership of the test data (**Sirag**, col 8, lines 4-6); i. in the case where the classification membership generated by the fuzzy rule having the greatest firing strength does not correctly match the known classification membership of the test data,

tuning the fuzzy rule based on the classification error as in step c (**Sirag**, col 7, lines 37-47; col 8, lines 24-38); and ii. in the case where the classification membership generated by the fuzzy rule having the greatest firing strength correctly matches the known classification membership of the test data, applying a learning rule to update the membership function parameters such that the classification error is minimized for high-dimensional classification tasks (**Sirag**, col 7, lines 37-47; col 6, lines 16-35). EN: The substance of the preamble is anticipated by Sirag at col 5 and 6.

Claim 2

Sirag anticipates a rule base generated by the method of claim 1 (**Sirag**, col 7, lines 36-68; col 8, lines 1-23).

Claim 10

Sirag anticipates a. providing an on-line learning fuzzy inference network, wherein the fuzzy inference network generates a rule base of fuzzy rules, with each fuzzy rule assigned to a class label, and each fuzzy rule including at least one membership function corresponding to a dimension of the data, with each membership function including membership function parameters, wherein the fuzzy rules are used for classifying input data into memberships, wherein test data with a known classification membership is provided to the fuzzy inference network and wherein the fuzzy inference network uses the fuzzy rules to generate classification memberships for the test data by firing the fuzzy rules with each fuzzy rule fired assigned a firing strength based on its match to the test data, and determining the fuzzy rule having the greatest firing strength, where the membership functions of the rule having the greatest firing

strength are compared to the known classification membership of the test data to determine classification error and wherein the firing frequency count of each fuzzy rule is stored, the improvement comprising (**Sirag**, col 5, lines 28-68; col 6, lines 1-68); b. determining whether the firing strength of the fuzzy rule having the greatest firing strength exceeds a predetermined threshold (**Sirag**, col 6, lines 29-35); c. in the case where the firing strength of the fuzzy rule having the greatest firing strength exceeds the threshold, tuning the fuzzy rule based on the classification error (**Sirag**, col 6, lines 36-68); and d. in the case where the firing strength of the fuzzy rule having the greatest firing strength does not exceed the threshold, determining whether the classification membership generated by the fuzzy rule having the greatest firing strength correctly matches the known classification membership of the test data (**Sirag**, col 8, lines 4-6); i. in the case where the classification membership generated by the fuzzy rule having the greatest firing strength does not correctly match the known classification membership of the test data, tuning the fuzzy rule based on the classification error as provided in the case represented by c (**Sirag**, col 7, lines 37-47; col 8, lines 24-38); and ii. in the case where the classification membership generated by the fuzzy rule having the greatest firing strength correctly matches the known classification membership of the test data, applying a learning rule to update the membership function parameters such that the classification error is minimized for high-dimensional classification tasks (**Sirag**, col 7, lines 37-47; col 6, lines 16-35).

Claim 11

Sirag anticipates a firing frequency count calculated for each fuzzy rule and incremented each time the fuzzy rule is fired, the firing frequency count being stored in the processing device, and a rule tuning and learning rule application processor connected with the fuzzy inference network to receive the fuzzy rules (**Sirag**, col 5, lines 27-68; col 6, lines 1-68; Fig. 2); the classification error (**Sirag**, col 5, lines 27-49); the firing strength, the firing frequency count, and the classification membership generated by for the fuzzy rule having the greatest firing strength (**Sirag**, col 5, lines 59-68; col 6, lines 1-28); the test data, and the known classification memberships for the test data (**Sirag**, col 5, lines 36-68) ; said processor operative for determining whether the firing strength of the fuzzy rule having the greatest firing strength exceeds a predetermined threshold (**Sirag**, Fig. 2; col 6, lines 59-63); and a. in the case where the firing strength of the fuzzy rule having the greatest firing strength exceeds the threshold, tuning the fuzzy rule based on the classification error (**Sirag**, col 6, lines 36-68); and b. in the case where the firing strength of the fuzzy rule having the greatest firing strength does not exceed the threshold, determining whether the classification membership generated by the fuzzy rule having the greatest firing strength correctly matches the known classification membership of the test data (**Sirag**, col 8, lines 4-6); i. in the case where the classification membership generated by the fuzzy rule having the greatest firing strength does not correctly match the known classification membership of the test data, tuning the fuzzy rule based on the classification error (**Sirag**, col 7, lines 37-47; col 8, lines 24-38); and ii. in the case where the classification membership generated by the

fuzzy rule having the greatest firing strength correctly matches the known classification membership of the test data, applying a learning rule to update the membership function parameters such that the classification error is minimized for high-dimensional classification tasks (**Sirag**, col 7, lines 37-47; col 6, lines 16-35). EN: The substance of the preamble is anticipated by Sirag at col 5 and 6.

Claim 12

Sirag anticipates a rule base generated by the method of claim 11 (**Sirag**, col 7, lines 36-68; col 8, lines 1-23).

Claim 19

Sirag anticipates a. an on-line learning fuzzy inference network wherein the fuzzy inference network generates a rule base of fuzzy rules, with each fuzzy rule assigned to a class label, and each fuzzy rule including at least one membership function corresponding to a dimension of the data, with each membership function including membership function parameters, wherein the fuzzy rules are used for classifying input data into memberships, wherein test data with a known classification membership is provided to the fuzzy inference network and wherein the fuzzy inference network uses the fuzzy rules to generate classification memberships for the test data by firing the fuzzy rules with each fuzzy rule fired assigned a firing strength based on its match to the test data, and determining the fuzzy rule having the greatest firing strength, where the membership functions of the rule having the greatest firing strength are compared to the known classification membership of the test data to determine classification error and wherein the firing frequency count of each fuzzy rule is stored

(**Sirag**, col 5, lines 28-68; col 6, lines 1-68); b. a rule tuning and learning rule application processor connected with the fuzzy inference network to receive the fuzzy rules (**Sirag**, col 5, lines 27-68; col 6, lines 1-68; Fig. 2); the classification error (**Sirag**, col 5, lines 27-49); the fining strength, the firing frequency count, and the classification membership generated by the fuzzy rule having the greatest firing strength (**Sirag**, col 5, lines 59-68; col 6, lines 1-28); the test data, and the known classification memberships for test data (**Sirag**, col 5, lines 36-68); said processor operative for determining whether the firing strength of the fuzzy rule having the greatest firing strength exceeds a predetermined threshold (**Sirag**, Fig. 2; col 6, lines 59-63); and i. in the case where the firing strength of the fuzzy rule having there test firing strength exceeds the threshold, tuning the fuzzy rule based on the classification error (**Sirag**, col 6, lines 36-68); and ii. in the case where the firing strength of the fuzzy rule having the greatest firing strength does not exceed the threshold, determining whether the classification membership generated by the fuzzy rule having the greatest firing strength correctly, matches the known classification membership of the test data (**Sirag**, col 8, lines 4-6); a. in the case where the classification membership generated by the fuzzy rule having the greatest firing strength does not correctly match the known classification membership of the test data, tuning the fuzzy rule based on the classification error (**Sirag**, col 7, lines 37-47; col 8, lines 24-38); and b. in the case where the classification membership generated by the fuzzy rule having the greatest firing strength correctly matches the known classification membership of the test data, applying a learning rule to update the membership function parameters such that the classification error is

minimized for high-dimensional classification tasks (**Sirag**, col 7, lines 37-47; col 6, lines 16-35).

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

9. Claims 13-18 are objected to. Claims 1-12 and 19 are rejected.

Correspondence Information

10. Any inquiry concerning this information or related to the subject disclosure should be directed to the Examiner, Joseph P. Hirl, whose telephone number is (703) 305-1668. The Examiner can be reached on Monday – Thursday from 6:00 a.m. to 4:30 p.m.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Anil Khatri can be reached at (703) 305-0282.

Any response to this office action should be mailed to:

Commissioner of Patents and Trademarks,

Washington, D. C. 20231;

or faxed to:

(703) 746-7239 (for formal communications intended for entry);

or faxed to:

(703) 746-7290 (for informal or draft communications with notation of "Proposed" or "Draft" for the desk of the Examiner).

Hand-delivered responses should be brought to:

Receptionist, Crystal Park II

2121 Crystal Drive,

Arlington, Virginia.

Joseph P. Hirl

March 3, 2004

Wilbert L. Starks, Jr.
Primary Examiner
Art Unit - 2121